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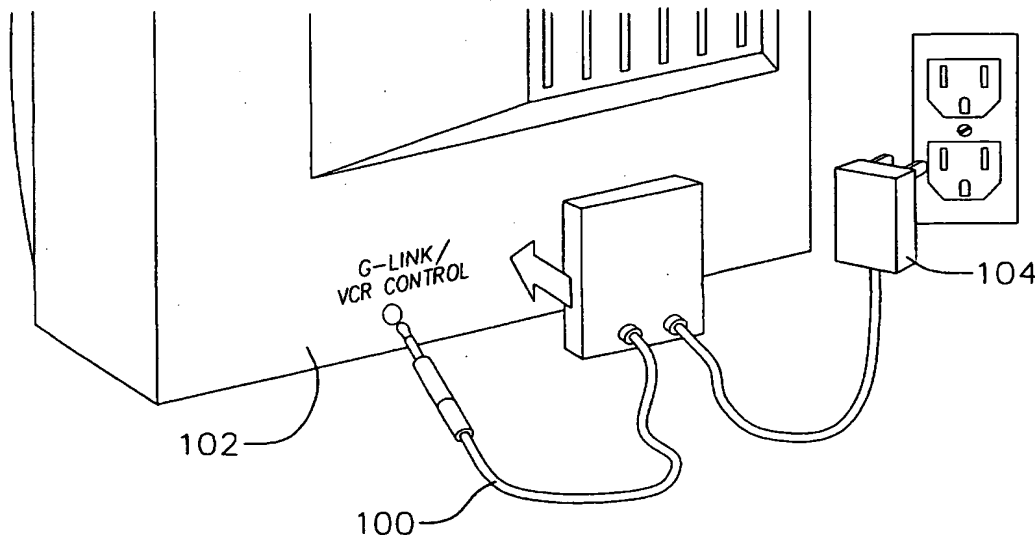
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(54) Title: DOWNLOAD SYSTEM FOR CONSUMER ELECTRONIC DEVICES



(57) Abstract

A system for reprogramming a consumer electronic device includes a consumer electronic device (CED) having a CED processor and a CED memory and a CED serial port connected to the processor, the memory storing CED processor instructions and CED data. The system also includes a download module having a download processor and a download memory and a download serial port connected to the download processor. The CED processor periodically applies a signal to the CED serial port. When the download serial port is connected to the CED serial port to make a serial connection and the download processor receives one of the periodic signals from the CED processor, the download processor initiates the download of one or more of download instructions and download data from the download memory to the CED memory over the serial connection.

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DOWNLOAD SYSTEM FOR CONSUMER ELECTRONIC DEVICES

CROSS-REFERENCE TO RELATED APPLICATION

This application claims priority of U.S. Provisional Application No. 60/133,971 filed May 13, 1999, the disclosure of which is incorporated fully herein.

FIELD OF THE INVENTION

The present invention relates generally to television systems and more particularly, to a physical device for providing program guide information to a television.

BACKGROUND OF THE INVENTION

Historically, only hardcopy television program schedule guides were available. More recently, as illustrated by the Levine Patent, U.S. Patent No. 4,908,713, television program guides have become available in electronic form. Television program schedule guides have listed the available television programs by day of the week, time of day, channel, and program title.

The earliest versions of on-screen electronic program guides ("EPG") provided for the storage of program schedule information in an electronic memory connected to the television receiver and generally provided for the on-screen formatting and display of the program schedule information on the television screen. The early EPGs typically overlaid the television programming. A network operator is often responsible for downloading the EPG data into a television.

Later EPGs provided viewer-to-EPG interaction improvements and provided Picture-In-Guide ("PIG") display of the television program simultaneous with the display of the EPG. International Application No. PCT/US95/11173 (International Publication No. WO 96/07270), the disclosure of which is incorporated by reference herein for all purposes, illustrates such an improvement.

An EPG receives program information and ancillary information from data encoded onto scan lines of the Vertical Blanking Interval (VBI) of the television signals generated by stations within a data distribution network. The VBI data can be received by a television or a set-top box (STB) equipped to receive the VBI data. Hereinafter, TV/STB represents either a television and/or a set-top box.

In some environments, VBI data may not be available. The G-link cartridge is external to a TV/STB and enables a demonstration of an EPG in an environment where VBI data is not available. Although an EPG may have an internal demonstration mode, which shows sample screens of product features with simulated data, the internal demonstration mode is limited. Tight memory constraints within televisions limits the extent of an internal demonstration mode. Thus, an external demonstration cartridge, i.e., G-link cartridge, can provide an expanded demonstration of EPG features.

1 SUMMARY OF THE INVENTION

5 A system for reprogramming a consumer electronic device includes a consumer electronic device (CED) having a CED processor and a CED memory and a CED serial port connected to the processor, the memory storing CED processor instructions and CED data. The system also includes a download module having a download processor and a download memory and a download serial port connected to the download processor. The CED processor periodically applies a signal to the CED serial port. When the download serial port is connected to the CED serial port to make a serial connection and the download processor receives one of the periodic signals from the CED processor, the download processor initiates the download of one or more of download instructions and download data from the download memory to the CED memory over the serial connection. The consumer electronic device can be any consumer electronic device, but usually is a video device, such a television, video recorder, satellite receiver, hard disk video recorder, television set top box or cable box. The download instructions or data may be a demo program or demo data which allow the consumer electronic device to operate in a demonstration mode using the downloaded instructions and/or data. One such demonstration modes demonstrates an interactive electronic program guide. The downloaded instructions and/or data may be downloaded using one or more bootstrap stages which provide the consumer electronic device with technique to download and utilize a final patch load of instructions and/or data.

BRIEF DESCRIPTION OF THE DRAWINGS

- 25 FIG. 1 shows the initial bootstrap stage;
FIG. 2 shows the final bootstrap stage;
FIG. 3 shows the 20-second timer flowchart;
FIG. 4 shows the patch load stage;
FIG. 5 depicts the G-link cartridge with AC-DC power converter, connector, and G-link television port;
30 FIG. 6 shows the initial screen when the G-link cartridge is plugged in;
FIG. 7 shows the screen when the data begins downloading from the G-link cartridge;
FIG. 8 shows the screen after 65% of the data has been loaded into the TV/STB;
FIG. 9 shows the screen after 95% of the data has been loaded into the TV/STB;
FIG. 10 shows a screen where the data has finished loading into the TV/STB;
35 FIG. 11 shows the "Simulated <call letters>" where the call letters are "CBS"; and
FIG. 12 shows an overlay message, which indicates that the video is simulated and that the viewer would be watching, "<Show title> on <call letters>," if the viewer were at home.

DETAILED DESCRIPTION

The G-link cartridge is a physical device which plugs into the back of a TV/STB. One application of the G-link cartridge is the retail environment, such as in a Circuit City store. The G-link cartridge provides simulated data instantly so that a salesperson, for example, can demonstrate an EPG regardless of the store's setup or power supply. Many retailers power down their sales floor on a daily basis with a single switch so maintaining live data with minimal involvement is impossible. When the televisions or set-top boxes are turned off, the EPG loses its downloaded data. The G-link cartridge provides the EPG data that is normally transmitted to the television via the VBI of a television signal. When a TV/STB is sold or removed from the sales floor, the G-link cartridge is removed from the TV/STB. A Velcro patch on the G-link cartridge is useful for attaching/detaching the G-link cartridge to/from a flat surface on the back of the TV/STB.

The G-link cartridge enables television sales people to demonstrate an EPG. The G-link cartridge includes sample channels and information, which when transferred to a TV/STB, shows how an EPG operates and how an EPG appears. The G-link cartridge provides simulated data, to allow retailers the ability to demonstrate an EPG without access to over the air television transmission or a cable television system carrying EPG data. Although, the EPG data is not live data, it does provide an interactive EPG, which enables its users to appreciate the features of an EPG. Thus, sales people and customers can interact with an EPG anytime.

The ability to demonstrate EPG features and functionality is extremely important as a retail marketing tool to support the TV/STB manufacturer and to maximize retail sales of TV/STBs. The G-link cartridge improves the marketing message through the use of improved graphics, interaction, and more in-depth feature explanations. The G-link cartridge provides an expanded demonstration by giving more detailed explanations, additional screens and improved brand identifying graphics. The additional memory provided by the G-link cartridge gives the EPG expanded data capability. The G-link cartridge includes EPG patches and data, which are contained within its non-volatile memory.

Retailers want minimum maintenance to ensure a demonstration is available "on demand" or with a touch of a button. The G-link cartridge, upon detecting when a TV/STB unit has been AC powered on (such as in the morning), sends demonstration cartridge data to the TV/STB.

The G-link cartridge guarantees that an EPG demonstration is available in the retail environment. In a retail environment, it is useful to demonstrate an EPG with canned demonstration data, rather than with live data because it provides a consistent message to all consumers and minimizes sales force training time. "Canned demonstration data" is the phrase used to describe the channel lineup and programming data that are stored in the G-link cartridge, as opposed to data received from a broadcast television signal.

Provided that canned demonstration data is desired, it would be a waste of broadcast bandwidth to download such demonstration data via the VBI. It is wasteful to broadcast "demo

1 pictures," illustrations and diagrams that are useful in a retail setting but are worthless to the end
users of a live broadcast. In addition, the downloading of EPG data via the VBI is prone to
network operator error. In short, allowing retail TV/STB units to run off of VBI patches and data
would be a waste of bandwidth and would be prone to network operator errors. In any case, most
5 consumer electronics stores do not have live feeds, consequently, canned EPG data is needed to
demonstrate an EPG.

The G-link cartridge has data and instructions for the EPG. In the preferred embodiment
of the invention, the cartridge's data and instructions resides on the cartridge's ROM and is sent
to the TV/STB over a G-Link bus as a "G-link patch." It is a patch because many of the EPG's
10 functions exist in the TV/STB memory prior to the G-link patch being transferred to the TV/STB.
The G-link patch sends incremental functions for the EPG. In an alternative embodiment of the
invention, the cartridge's data and instructions may reside on any kind of non-volatile memory
and may be sent over any kind of bus that interfaces with a TV/STB unit.

Essentially the patching scheme deployed in the G-link cartridge is different from the
15 usual VBI patching scheme. The G-link cartridge patch download from the G-link cartridge to
the TV/STB is a 3-stage bootstrap process: (1) an initial bootstrap; (2) a final bootstrap; and (3)
a patch load. Each stage provides items that are used in the next stage. The preceding stage must
be successfully completed before the next one can begin. The TV/STB acts as the master and
the G-link cartridge acts as the slave.

20 The initial bootstrap stage provides the essential tools used in the Stage 2, Final Bootstrap.
Figure 1 shows the initial bootstrap stage. After the successful completion of the initial bootstrap
stage, the following items are available for use in the next stage: Faster probe packets (every .5
seconds), Watchdog timer, and End of stage packet handler.

At the beginning of the initial bootstrap stage, the G-link cartridge is in its initial state 10.
25 The TV/STB, which is a G-link master device, routinely sends to the G-link cartridge, a probe
request packet 11 that looks for the presence of a G-link slave device. In a preferred embodiment
of the invention, if the TV/STB determines within 5.6 seconds 12 that the G-link cartridge is
present, then the G-link cartridge sends an identify response packet 13. The TV/STB requests
the next packet from the G-link cartridge 14. In a preferred embodiment of the invention, if the
30 G-link cartridge responds within 5.6 seconds to the next packet request 15, then the G-link
cartridge does a memory write to its memory 16. The TV/STB sends another probe request
packet to the G-link cartridge 17. The G-link cartridge does a memory write to the TV/STB that
causes the TV/STB to "execute" the instructions within the memory write 18. The TV/STB
executes the instructions contained within the memory write from the G-link cartridge 19.

35 The final bootstrap stage provides the patch information that is loaded in the third stage.
Figure 2 shows the final bootstrap stage. After the successful completion of the final bootstrap
stage, the following items are available: TV screen display that shows real-time download
percent complete, watchdog timer (replaces watchdog timer from stage 1), Get Next packet

1 (suppresses Probe packets from stage 1), End of stage packet handler (replaces End of stage packet from stage 1), Retry packet, and size of a final patch.

At the beginning of the final bootstrap stage, the TV/STB sends a probe request packet to the G-link cartridge 20. In a preferred embodiment of the invention, the TV/STB determines within .5 seconds whether the G-link cartridge has responded to the TV/STB 21. If the G-link cartridge does respond within .5 seconds, then the G-link cartridge does a memory write 22 until the end of the final bootstrap stage 23. At the end of the final bootstrap stage, the instruction within the memory writes are executed by the TV/STB 24.

Figure 3 shows the 20-second timer flowchart, which is applicable in a preferred embodiment of the invention. During the final bootstrap stage, if a 20-second timer expires 30, then the bootstrap process returns to the initial bootstrap stage 31, otherwise the bootstrap process is proceeding properly 32.

Figure 4 shows the patch load stage. The patch load stage arranges the information from the first two stages into usable patch code. At the beginning of the patch load stage, the TV/STB gets a new packet from the G-link cartridge 40. The G-link cartridge does a memory write from its memory to the TV/STB 41. The TV/STB determines whether the packet has been successfully received by the TV/STB within a timer period 42. In the preferred embodiment of the invention, the timer period is three seconds. If the timer period expires 43, then the packet was not successfully transferred from the G-link cartridge to the TV/STB. If the packet is determined to be successfully received, then the timer period is reset 44, the displayed percentage completed on the television screen is incremented 45, and the TV/STB gets the next packet from the G-link cartridge 40. When the patch load end of stage is reached 46, the TV/STB goes into a patch load warm reset state. When the timer period expires 43, then the TV/STB determines whether a retry counter is greater than zero 50. The retry counter represents the number of times the TV/STB will retry a packet request because of the timer period expiration. If the retry counter is greater than zero, then the TV/STB will request another packet from the G-link cartridge 51. If the retry counter is not greater than zero, then the retry counter has been exhausted and the bootstrap process returns to stage 1, the Initial Bootstrap stage 52.

The G-link cartridge detects whether the TV/STB is a legacy product or a new product by examining a self-identification string from the TV/STB. This allows multiple G-link cartridge software versions to be put onto the same G-link cartridge memory. The appropriate version is sent from the G-link cartridge to the TV/STB when the TV/STB unit is identified.

After the code from the G-link cartridge has been downloaded into the TV/STB, the G-link cartridge monitors the G-Link bus to detect a reset of the EPG. If such a reset is detected, the G-link cartridge sends the patch again. The reset feature makes the system more robust. The download protocol is made robust, by incorporating retries, timeouts etc.

A G-link cartridge software version includes an auto-demo mode and/or an interactive demo mode. The auto-demo mode is an auto-looped presentation of an EPG's features. This

1 mode is not interactive. Screens on the television change automatically, thereby allowing the
viewer to sit back and enjoy the show without having to enter any input. The auto-demo mode
may be restarted by the viewer at any time. A continuous auto-demo mode, which also may
5 is automatically restarted once it is ended. In interactive demo mode, the sales person or the
customer can test-drive the EPG using the G-link cartridge sample channels and programs. The
interactive demo mode has a timeout feature that upon expiration of a time period, the interactive
demo mode terminates and the auto-demo is activated.

10 Once the G-Link cartridge is connected, the television will display a demonstration
banner from which the demonstration can be activated. When the demonstration is activated, the
demonstration will consist of display screens with pre-loaded simulated television programming
data, along with text box overlays to provide narrative descriptions and visual examples of EPG
product features.

15 The G-link cartridge is designed to allow the viewer (a retailer or potential purchaser) to
interrupt the demonstration and "interact" with the product (with the pre-loaded, simulated data).
Following a period of no activity (no buttons pressed), a timeout occurs and the beginning of the
demonstration is restarted. When the demonstration is finished, the television will return to its
normal viewing mode with a small demonstration banner appearing at the bottom of the screen.
20 This banner is intended to visually communicate that the television is equipped with an EPG and
that a demonstration is available.

The G-link demonstration may also be activated through the Manufacturer's menus.
Selecting the "Continuous Demonstration" menu item will activate the G-link demonstration in
a continuous mode. It can be exited by pressing the same button that will exit the internal
continuous demo.

25 The retailer needs to follow very few steps to install the G-link cartridge in order to make
the cartridge extremely simple – literally "plug and play." In order for the G-link cartridge to be
"plug and play," the setup must consist of no more than inserting the cartridge's G-link cable into
the G-link port on the rear of the television, powering up the cartridge, and downloading the data
into the television. The retailer is not required or expected to enter the regular Guide setup
30 screens.

Figure 5 depicts the G-link cartridge with AC-DC power converter, connector, and G-link
television port. The television port may reside anywhere on the television depending upon a
given manufacturer's television design. In an alternative embodiment of the invention, the G-link
cartridge can also be connected to an EPG equipped set-top box.

35 In the preferred embodiment of the invention, the G-link cartridge setup includes the
following:

- (1) unplugging the TV/STB;
- (2) plugging the G-link connector 100 into an input on the back of an EPG equipped

1 TV/STB 102;

(3) plugging an AC-to-DC power converter 104 into an AC outlet;

(4) plugging in the television and/or set-top box;

5 (5) the following information is displayed on the television screen: an EPG logo appears on the television screen, providing visual confirmation that the G-link cartridge is connected correctly; meanwhile the demonstration data loads from the cartridge to the television and a message is displayed on the television indicating that data is being loaded; and a Progress Bar with % completion, providing an on-screen indication of how much of the data loading has been completed (e.g., 32% completed, 48% completed, 65% completed, etc.);

10 (6) once the demonstration data is fully loaded, the TV/STB goes to regular TV/STB viewing mode and a Demonstration Banner appears at the bottom of the screen and a prompt will appear on the television screen indicating how to start the demonstration; and

(7) When the GUIDE button on the remote control is pressed, the Demonstration mode is activated and the demonstration begins.

15 In the preferred embodiment of the invention, the connector 100 is an infrared (IR) extender device. In an alternative embodiment of the invention, the connector uses other means of communication, such as radio frequencies (RF). In the preferred embodiment of the invention, the port into which the connector is input, is a G-link. G-link is the location where the IR extender device is connected. G-link is also the port and serial communication protocol that
20 allows a G-link cartridge to talk to an EPG board and firmware.

Once the G-link cartridge is installed, attempting to enter Set up through the manufacturer's menus or the Factory Test will activate the demonstration. In an exemplary embodiment of the invention, the demonstration will also be activated by pressing the VCR Plus+ key.

25 Figures 6-10 show setup screens in an exemplary embodiment of the invention. They are screen samples of the demonstrations. Figure 6 shows the initial screen when the G-link cartridge is plugged in. The initial screen indicates that the cartridge is installed correctly. Figure 7 shows the screen when the data begins downloading from the G-link cartridge. The data loading message indicates that there will be a delay before the demonstration begins. A progress bar with percent complete should be displayed until the data loading is complete. Figure 8 shows
30 the screen after 65% of the data has been loaded into the TV/STB. Figure 9 shows the screen after 95% of the data has been loaded into the TV/STB. Figure 10 shows a screen where the data has finished loading into the TV/STB. When the data has finished loading, the TV/STB returns to a television watching mode and the Demonstration Banner is displayed on the television. The Demonstration Banner consists of the GUIDE Plus+ logo and the text "Press GUIDE for Demo"
35 110. The word "GUIDE" will appear overlaying a button bitmap. When the GUIDE button on the remote control is pressed, the demonstration is activated.

In the preferred embodiment of the invention, all of the demonstration data is loaded into

1 the TV/STB initially. In an alternative embodiment of the invention, different demonstration data can be loaded into the TV/STB based on user input or the state of the EPG. The state of the EPG can be a function of the screens entered, time of day, user input, etc.

5 The G-link cartridge must remain connected to the TV/STB to keep the demonstration active because the demonstration data will be lost on a system reset. The most likely, but not necessarily the only cause for such a reset is that the TV/STB loses power for an extended period of time, which is common in a retail environment where power is often turned off every evening. If AC power is turned off, the demonstration data will automatically reload when it is turned back on provided that the G-link cartridge is attached to the TV/STB. Thus, if power is turned off in
10 the evening, the demonstration data will be automatically reloaded when power is turned back on the morning.

Canned Demonstration Data

15 The television stores one set of data, either "canned" or "live." It cannot maintain both sets of data in the television RAM simultaneously. An EPG setup requires a user to enter information such as zip code, TV/STB brand, etc. In order to provide a satisfactory product demonstration without requiring a retailer to go through an EPG setup, the G-link cartridge enables a demonstration that will display only the canned TV programming data. This is the only way to guarantee a full set of useful data for the demonstration, as retail locations very often do
20 not provide an adequate VBI feed.

In the preferred embodiment of the invention, the demonstration data will comprise the following components:

25 26 channels of programming will be included. The following channels in this order are required: an ABC, FOX, CBS, NBC, UPN, WB, PBS, CBC, American Movie Classics, BET, Cinemax, CNBC, The Discovery Channel, Disney, ESPN, ESPN 2, fX, The History Channel, HBO, Lifetime, MSNBC, Nickelodeon, Sci-Fi, TNT, Univision and USA. These channels are being selected specifically because of their broad national distribution as well as their content and propensity for interesting descriptions.

30 2 days of titles and descriptions for all 26 channels and an additional five days of titles and descriptions for the Sort categories (Movies, Sports, Children's) will be stored. The "current time" when the demonstration is started will be Wednesday, 8:00 P.M..

The data provides minimal "dating" of content.

35 The clock in the Picture-in-picture (PIP) will be replaced with "Simulated <call letters>." While in the demonstration mode, the video displayed in the PIP will not correspond to the data in the EPG since the EPG data is canned (and often the video will be laser disk video). Because of this, the video presented in the PIP will be whatever video is being broadcast to the TV during the time the demonstration is running. This could cause confusion, therefore, the PIP

1 will "note" that the data is simulated throughout the demonstration. This will be executed
via an overlay on the PIP as shown in figure 11.

5 Figure 11 shows the "Simulated <call letters>" where the call letters are "CBS" 120. The call
letters will match what is highlighted in the EPG or the channel to which the guide is locked in
the demonstration.

Interactivity

10 Once the G-link cartridge is installed and the data is loaded, a potential viewer/buyer knows
that the television is EPG equipped via an on-screen prompt. The on-screen prompt is part of a
Demonstration Banner at the bottom of the television screen. To start the demonstration, the
viewer simply presses the GUIDE button, as indicated in the prompt. This is the first level of
"interactivity" in the demonstration.

15 In the preferred embodiment of the invention, the Demonstration Banner is approximately
1/4 the width of the screen. It will start in the bottom/center of the screen. To reduce burn-in on
the television screen, it will be necessary to move it's location every few minutes.

20 The demonstration is designed to be extensively interactive. The viewer is able to interrupt
the demonstration and sample various EPG screens. Canned data allows the viewer to access and
use the functionality demonstrated. At any time during the demonstration, the viewer may press
any of the buttons the EPG recognizes (for example: Guide, OK, up, down, left, right, info, menu,
PIP, or a digit key) on the remote to interrupt the Demonstration and activate the Interactive
Guide mode. When this happens, the Grid screen will appear defaulting to the locked PIP mode
(since the video cannot be changed). There will be prompts during the demonstration that
25 suggest to the viewer to interrupt the demonstration and use the features and functions described
in the demo.

30 If the demonstration mode is entered from the Manufacturer's menu while the G-link
cartridge is connected, the demonstration activated will be the external demonstration cartridge
version. This demonstration will be continuous and non-interactive. This mode may be desirable
when set up on an end cap ("end cap" is a retail term. It refers to the end of a product aisle, which
is considered a premium location for product to be displayed) or a location not easily reached by
a sales associate or customer.

The following table lists remote keys and what will occur in the preferred embodiment of the
invention while in the G-link cartridge is connected.

Mode (following the installation of the demonstration cartridge)	Key	Result
TV Viewing Mode	Guide, VCR Plus+	Demonstration will be activated and Demo will begin to show screens in sequential order
TV Viewing Mode	All others	Will perform the way they normally would with TV Viewing
Demonstration Mode	Guide Recognized Keys (Guide, OK, up, down, left, right, info, menu, PIP, or a digit key)	Demonstration will be interrupted and the Interactive Mode will begin. The viewer may now "interact" with the Guide using the canned data.
Demonstration Mode	Volume + or -	Will work normally
Demonstration Mode	Clear	Demo will be exited and TV mode will be activated. The demo banner will be displayed.
Demonstration Mode	All other remote keys	Do nothing
Interactive Mode	Guide	Demonstration will be reactivated at the beginning and replay.

1	Interactive Mode	All Others	Will perform the way they normally would during Guide Mode but data will be simulated.
5			If the OK/Select/Enter button is pressed, video will be displayed with a text overlay indicating the video is simulated and what show and channel would have appeared if the viewer was at home.
10			

15 There are video overlays in the Interactive Mode. While in Interactive Mode, pressing the OK/Enter/Select button will drop the Guide and display the video supplied to the TV. Figure 12 shows an overlay message, which indicates that the video is simulated and that the viewer would be watching "<Show title> on <call letters>" if the viewer were at home 130. In figure 12 the show title is "Walker, Texas Ranger," and the call letters are CBS.

Timeouts

A television has a manufacturer's time out. The demonstration overrides the manufacturer's time out to avoid the demonstration failing to complete.

25 The demonstration has an Interactive Mode Timeout. Once in interactive mode, if there are no buttons pressed after a period of time, a timeout will return the viewer back to the beginning of the demonstration and the demonstration will continue until it is completed. The demonstration can be "interrupted" and the EPG "test driven" an unlimited number of times. When the demonstration is complete, the TV/STB will return to TV viewing mode and the EPG Demonstration Banner will return to the bottom of the screen.

Manufacturer specific screens, text, functionality, and customization

35 Screens will be manufacturer specific and therefore may look slightly different. Additionally, text may require slight variations by manufacturer to accommodate different buttons labels, etc. Consequently, there are manufacturer ID code triggers for text differences, screen differences and functionality differences.

Although differences in "look and feel" and EPG functionality will be addressed with manufacturer ID code triggers, a manufacturer may want to include their logos in the demonstration. Graphic customization by original equipment manufacturers (OEMs) will be

1 limited to logo/text displays in predefined areas of the demonstration. likely limited to one splash screen at the beginning of the demonstration.

On-Screen "look and feel"

5 The demonstration will include overlay boxes. Each function demonstrated will be presented with an on-screen text box describing its functionality. To accomplish this, there may be multiple "actions" or events. (For example, a screen will be presented, an overlay box with text will be wiped into the screen, then following a predetermined timeout period, the text box and copy are wiped off the screen from left to right.)

10 The overlay box will be solid in color (light yellow with a solid black border) and will be sized for the copy. Its location on the screen will be determined by what is being demonstrated and what should or could be covered up. The demonstration begins with a dark blue screen with a product logo and features list. This screen is repeated at the end of the demonstration along with two call to action screens (pick up the remote and try the guide instructions). These are the only places where the text box and copy colors vary.

15 The demonstration simulates product usage. Several screens may be strung together to give the simulated appearance of using the product. An example of this is using the "sort" function to find a particular theme movie. The sequence of screens would first include the main sort screen, an overlay box describing the functionality, then a second screen would display what appears on the screen when "Movies" are selected from the screen, the third screen would display a simulated selection of "All," the fourth screen would display a simulated listing of all the movies available.

20 In alternative embodiments of the invention, various colors can be used for text. In the preferred embodiment of the invention, when the text is in the text boxes, it will be black. In addition, the text on the introductory screens and the closing call to action screens will be white.

25 A font different from that used in EPG must be downloaded from the G-link cartridge to be used in the text boxes of the external demonstration. The font recommendation is Tekton (Regular, not the italic version).

30 *Some graphics may be used to enhance the external demonstration. Some graphics that may be incorporated include full screen EPG and OEM logos, and small, icon-like graphics to enhance the text boxes.*

35 Animation can be used at certain points in the demonstration to enhance the demonstration and increase the entertainment value of the demonstration. Logos or other graphics may be used in an animated format.

1 WHAT IS CLAIMED IS:

1. A system for reprogramming a consumer electronic device comprising:

5 a consumer electronic device (CED) having a CED processor and a CED memory and a CED serial port connected to the processor, the memory storing CED processor instructions and CED data;

a download module having a download processor and a download memory and a download serial port connected to the download processor;

10 wherein the CED processor periodically applies a signal to the CED serial port; and

wherein, when the download serial port is connected to the CED serial port to make a serial connection and when the download processor receives one of the periodic signals from the CED processor over the serial connection, the download processor initiates the download of one or more of download instructions and download data from the download memory to
15 the CED memory over the serial connection.

2. The system of claim 1 wherein the one or more of download instructions and download data comprises a bootstrap download and a patch download.

20 3. The system of claim 1 wherein the CED processor instructions and CED data are not discarded from the CED memory when the one or more of download instructions and download data downloaded to the CED memory.

25 4. The system of claim 1 wherein the one or more of download instructions and download data comprises one or more of a demonstration program and a set of demonstration data that is used by the CED processor to generate a demonstration on the consumer electronic device.

30 5. The system of claim 1 wherein the consumer electronic device is a television.

35 6. The system of claim 1 wherein the consumer electronic device is a video recorder.

7. The system of claim 1 wherein the consumer electronic device is a television set top box.

1 8. The system of claim 1 wherein the consumer electronic device is a hard disk
video recorder.

5 9. The system of claim 1 wherein the consumer electronic device is a satellite
receiver.

10. The system of claim 1 wherein the consumer electronic device is a cable box.

10 11. The system of claim 1 wherein the one or more of download instructions and
download data comprises a demonstration interactive electronic program guide.

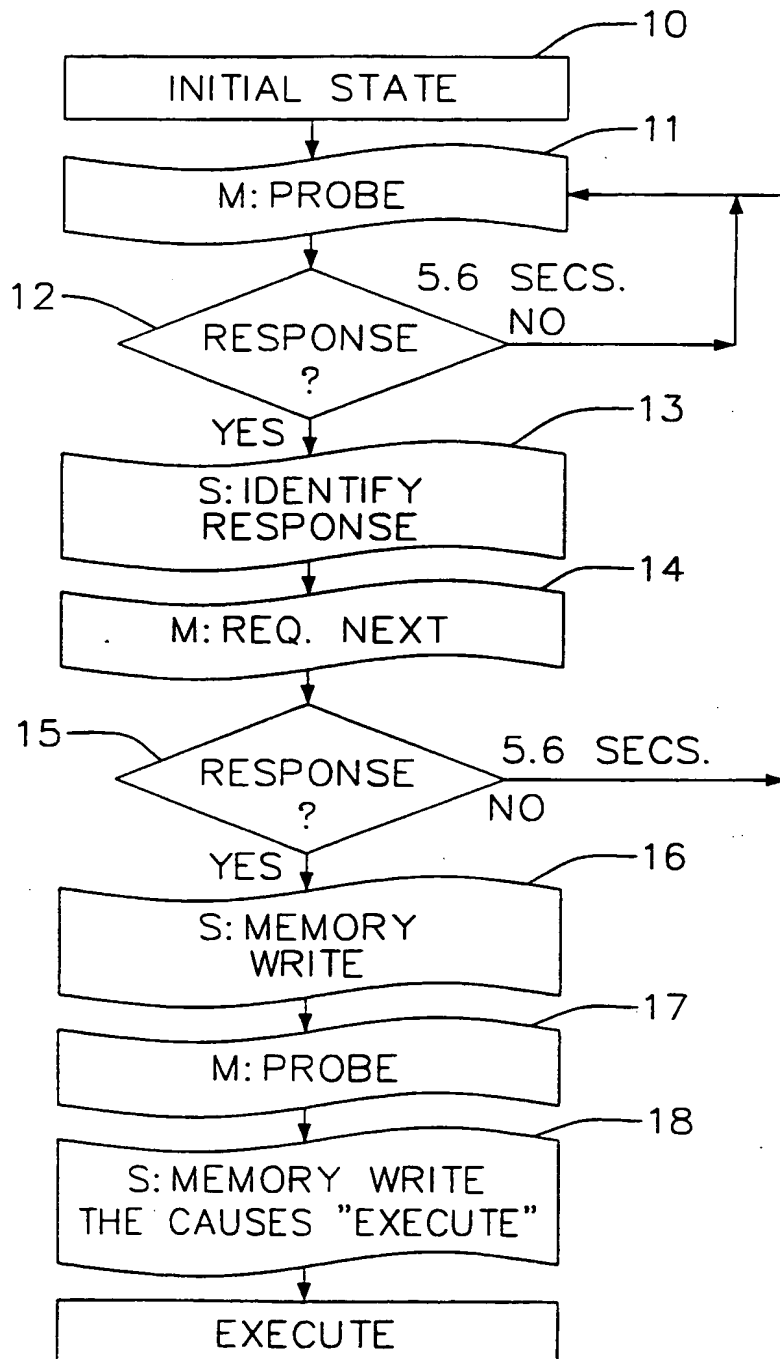
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FIG. 1

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FIG. 2

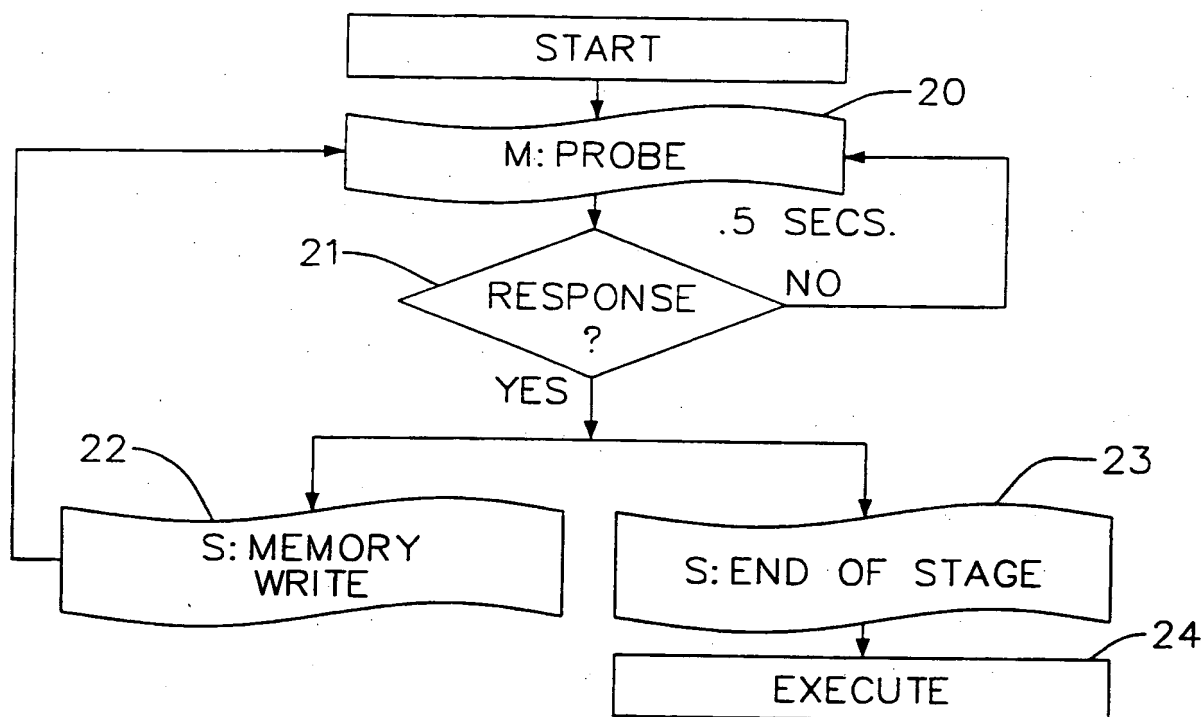


FIG. 3

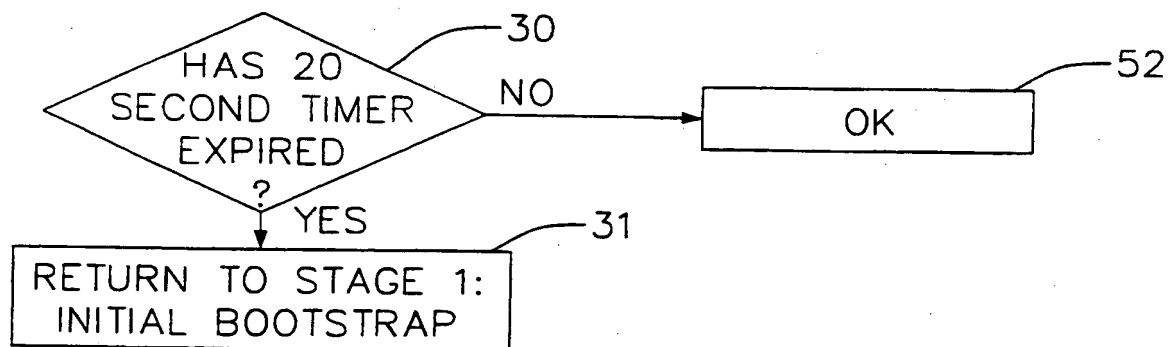
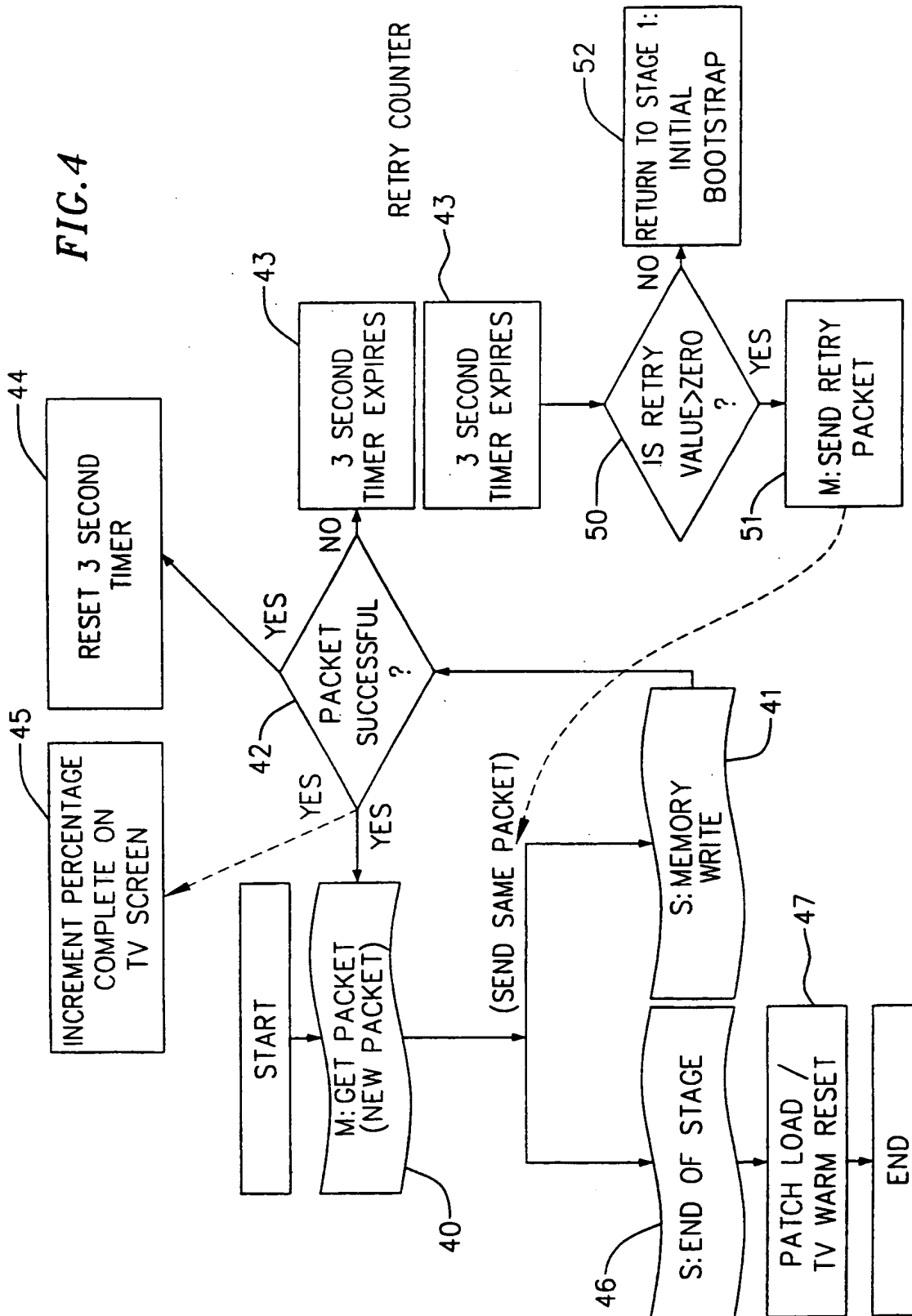


FIG. 4



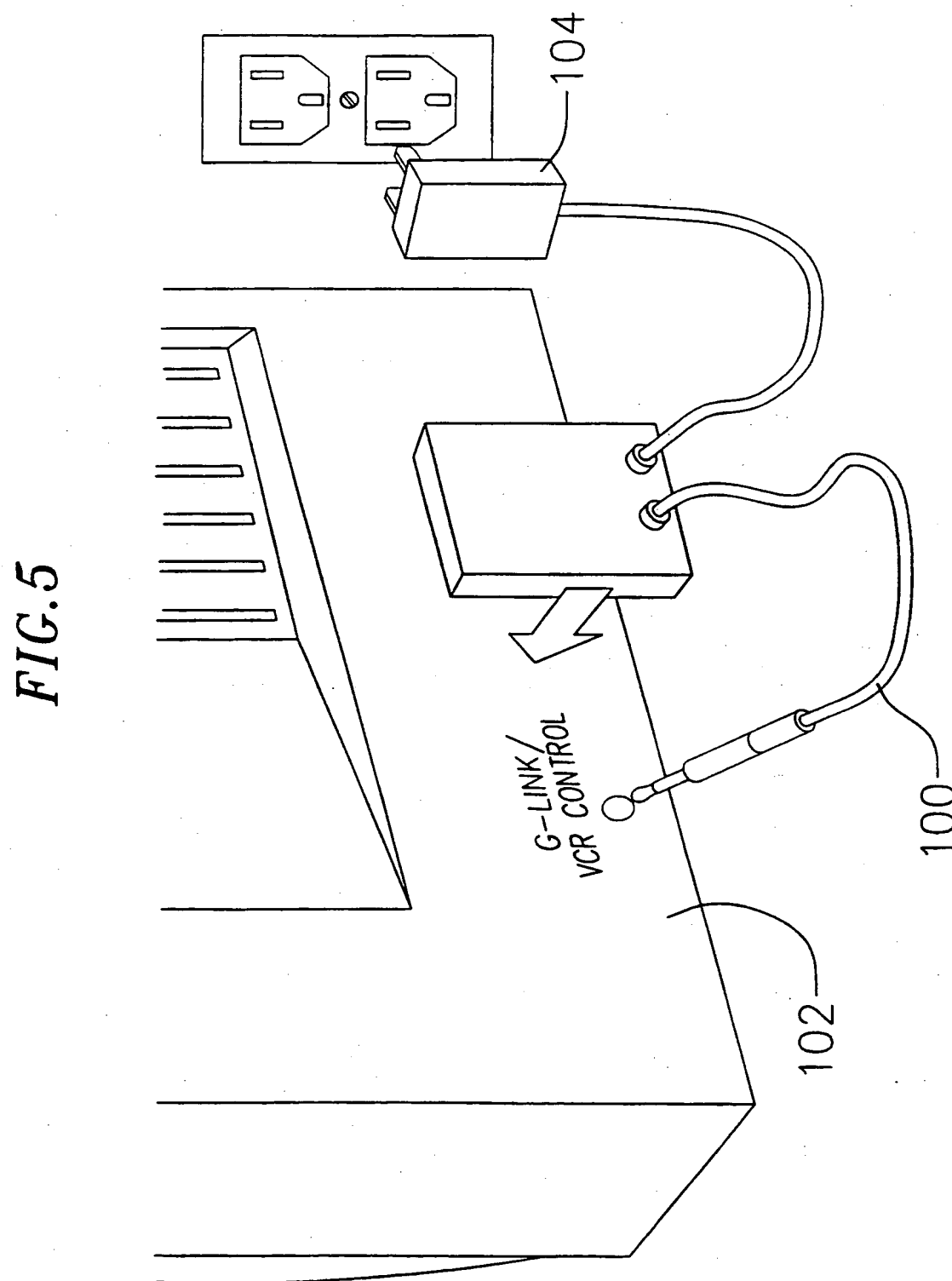


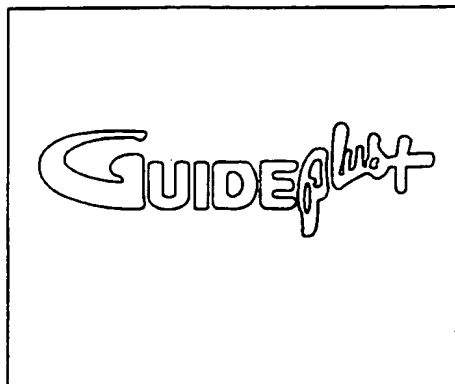
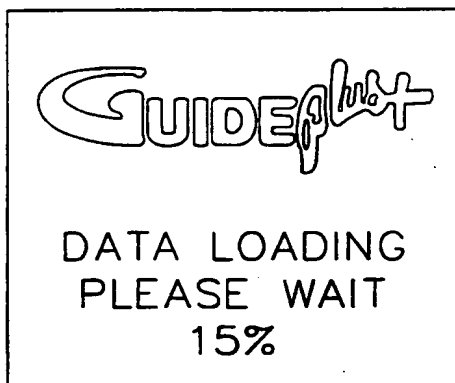
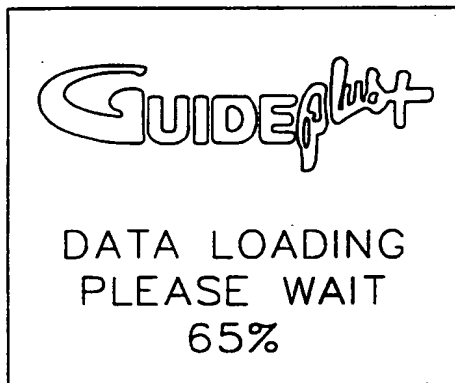
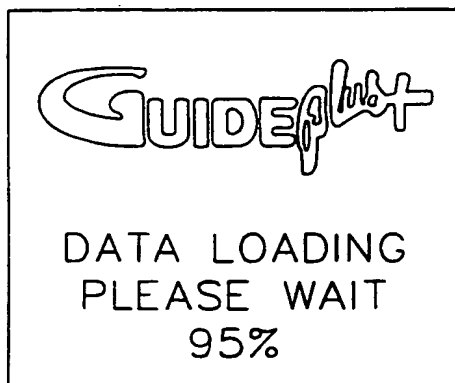
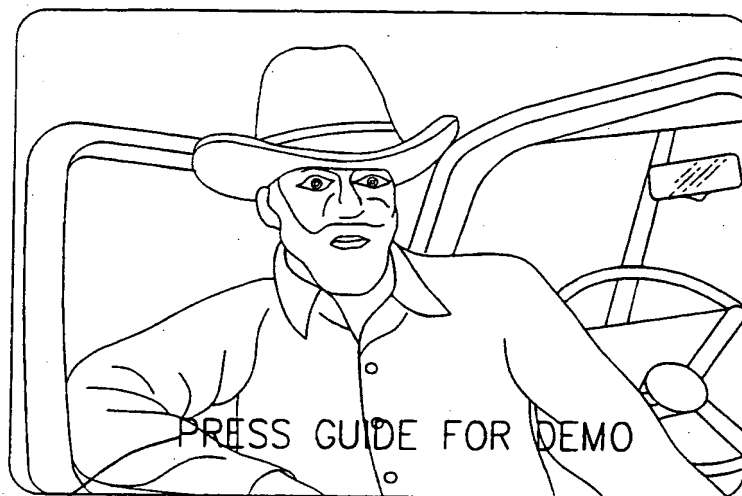
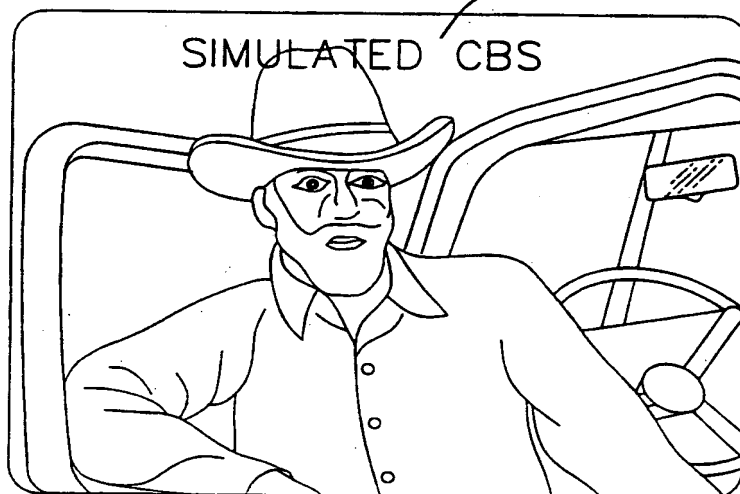
FIG. 6*FIG. 7**FIG. 8**FIG. 9*

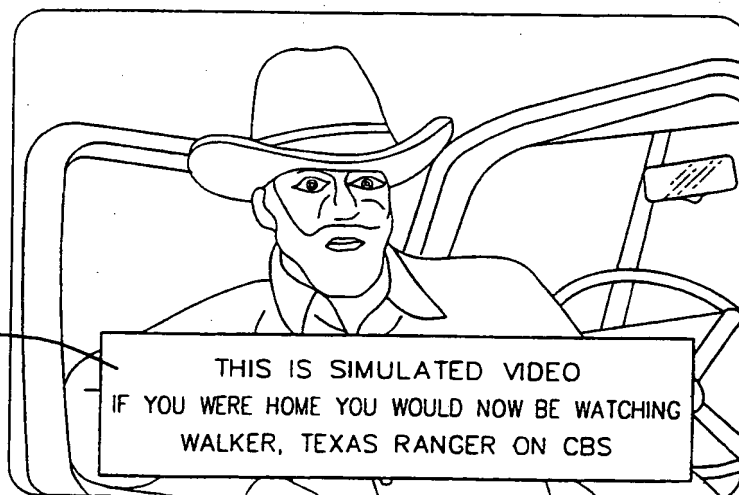
FIG. 10

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FIG. 11**FIG. 12**

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**SUBSTITUTE SHEET (RULE 26)**

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 00/13453

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H04N5/445

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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"&" document member of the same patent family

Date of the actual completion of the international search

17 August 2000

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23/08/2000

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INTERNATIONAL SEARCH REPORT

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International Bureau



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WO 00/070867 A1

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(22) International Filing Date: 15 May 2000 (15.05.2000)

(25) Filing Language: English

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(30) Priority Data:
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(72) Inventors; and

(75) Inventors/Applicants (for US only): **MACRAE, Douglas, B.** [US/US]; 23 Cart Path Road, Weston, MA 02493 (US).

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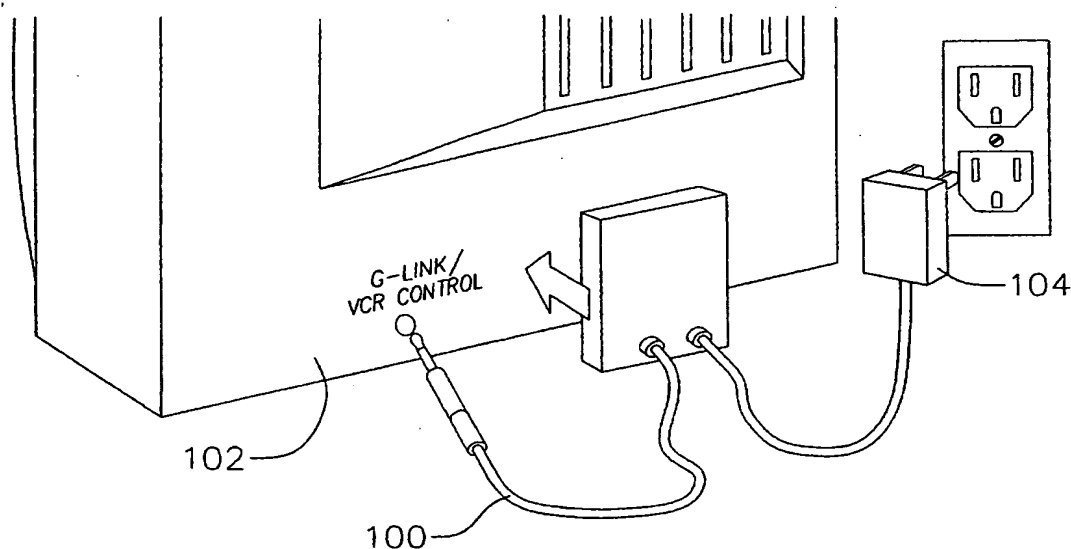
(74) Agent: **MONROE, Wesley, W.**; Christie, Parker & Hale, L.L.P., P.O. Box 7068, Pasadena, CA 91109-7068 (US).

(81) Designated States (*national*): AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: **DOWNLOAD SYSTEM FOR CONSUMER ELECTRONIC DEVICES**



(57) Abstract: A system for reprogramming a consumer electronic device includes a consumer electronic device (CED) having a CED processor and a CED memory and a CED serial port connected to the processor, the memory storing CED processor instructions and CED data. The system also includes a download module having a download processor and a download memory and a download serial port connected to the download processor. The CED processor periodically applies a signal to the CED serial port. When the download serial port is connected to the CED serial port to make a serial connection and the download processor receives one of the periodic signals from the CED processor, the download processor initiates the download of one or more of download instructions and download data from the download memory to the CED memory over the serial connection.



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DOWNLOAD SYSTEM FOR CONSUMER ELECTRONIC DEVICES

CROSS-REFERENCE TO RELATED APPLICATION

This application claims priority of U.S. Provisional Application No. 60/133,971 filed May 13, 1999, the disclosure of which is incorporated fully herein.

FIELD OF THE INVENTION

The present invention relates generally to television systems and more particularly, to a physical device for providing program guide information to a television.

BACKGROUND OF THE INVENTION

Historically, only hardcopy television program schedule guides were available. More recently, as illustrated by the Levine Patent, U.S. Patent No. 4,908,713, television program guides have become available in electronic form. Television program schedule guides have listed the available television programs by day of the week, time of day, channel, and program title.

The earliest versions of on-screen electronic program guides ("EPG") provided for the storage of program schedule information in an electronic memory connected to the television receiver and generally provided for the on-screen formatting and display of the program schedule information on the television screen. The early EPGs typically overlaid the television programming. A network operator is often responsible for downloading the EPG data into a television.

Later EPGs provided viewer-to-EPG interaction improvements and provided Picture-In-Guide ("PIG") display of the television program simultaneous with the display of the EPG. International Application No. PCT/US95/11173 (International Publication No. WO 96/07270), the disclosure of which is incorporated by reference herein for all purposes, illustrates such an improvement.

An EPG receives program information and ancillary information from data encoded onto scan lines of the Vertical Blanking Interval (VBI) of the television signals generated by stations within a data distribution network. The VBI data can be received by a television or a set-top box (STB) equipped to receive the VBI data. Hereinafter, TV/STB represents either a television and/or a set-top box.

In some environments, VBI data may not be available. The G-link cartridge is external to a TV/STB and enables a demonstration of an EPG in an environment where VBI data is not available. Although an EPG may have an internal demonstration mode, which shows sample screens of product features with simulated data, the internal demonstration mode is limited. Tight memory constraints within televisions limits the extent of an internal demonstration mode. Thus, an external demonstration cartridge, i.e., G-link cartridge, can provide an expanded demonstration of EPG features.

1 SUMMARY OF THE INVENTION

5 A system for reprogramming a consumer electronic device includes a consumer electronic device (CED) having a CED processor and a CED memory and a CED serial port connected to the processor, the memory storing CED processor instructions and CED data. The system also includes a download module having a download processor and a download memory and a download serial port connected to the download processor. The CED processor periodically applies a signal to the CED serial port. When the download serial port is connected to the CED serial port to make a serial connection and the download processor receives one of the periodic signals from the CED processor, the download processor initiates the download of one or more of download instructions and download data from the download memory to the CED memory over the serial connection. The consumer electronic device can be any consumer electronic device, but usually is a video device, such a television, video recorder, satellite receiver, hard disk video recorder, television set top box or cable box. The download instructions or data may be 15 a demo program or demo data which allow the consumer electronic device to operate in a demonstration mode using the downloaded instructions and/or data. One such demonstration mode demonstrates an interactive electronic program guide. The downloaded instructions and/or data may be downloaded using one or more bootstrap stages which provide the consumer electronic device with technique to download and utilize a final patch load of instructions and/or data. 20

BRIEF DESCRIPTION OF THE DRAWINGS

- 25 FIG. 1 shows the initial bootstrap stage;
FIG. 2 shows the final bootstrap stage;
FIG. 3 shows the 20-second timer flowchart;
FIG. 4 shows the patch load stage;
FIG. 5 depicts the G-link cartridge with AC-DC power converter, connector, and G-link television port;
30 FIG. 6 shows the initial screen when the G-link cartridge is plugged in;
FIG. 7 shows the screen when the data begins downloading from the G-link cartridge;
FIG. 8 shows the screen after 65% of the data has been loaded into the TV/STB;
FIG. 9 shows the screen after 95% of the data has been loaded into the TV/STB;
FIG. 10 shows a screen where the data has finished loading into the TV/STB;
35 FIG. 11 shows the "Simulated <call letters>" where the call letters are "CBS"; and
FIG. 12 shows an overlay message, which indicates that the video is simulated and that the viewer would be watching, "<Show title> on <call letters>," if the viewer were at home.

DETAILED DESCRIPTION

The G-link cartridge is a physical device which plugs into the back of a TV/STB. One application of the G-link cartridge is the retail environment, such as in a Circuit City store. The G-link cartridge provides simulated data instantly so that a salesperson, for example, can demonstrate an EPG regardless of the store's setup or power supply. Many retailers power down their sales floor on a daily basis with a single switch so maintaining live data with minimal involvement is impossible. When the televisions or set-top boxes are turned off, the EPG loses its downloaded data. The G-link cartridge provides the EPG data that is normally transmitted to the television via the VBI of a television signal. When a TV/STB is sold or removed from the sales floor, the G-link cartridge is removed from the TV/STB. A Velcro patch on the G-link cartridge is useful for attaching/detaching the G-link cartridge to/from a flat surface on the back of the TV/STB.

The G-link cartridge enables television sales people to demonstrate an EPG. The G-link cartridge includes sample channels and information, which when transferred to a TV/STB, shows how an EPG operates and how an EPG appears. The G-link cartridge provides simulated data, to allow retailers the ability to demonstrate an EPG without access to over the air television transmission or a cable television system carrying EPG data. Although, the EPG data is not live data, it does provide an interactive EPG, which enables its users to appreciate the features of an EPG. Thus, sales people and customers can interact with an EPG anytime.

The ability to demonstrate EPG features and functionality is extremely important as a retail marketing tool to support the TV/STB manufacturer and to maximize retail sales of TV/STBs. The G-link cartridge improves the marketing message through the use of improved graphics, interaction, and more in-depth feature explanations. The G-link cartridge provides an expanded demonstration by giving more detailed explanations, additional screens and improved brand identifying graphics. The additional memory provided by the G-link cartridge gives the EPG expanded data capability. The G-link cartridge includes EPG patches and data, which are contained within its non-volatile memory.

Retailers want minimum maintenance to ensure a demonstration is available "on demand" or with a touch of a button. The G-link cartridge, upon detecting when a TV/STB unit has been AC powered on (such as in the morning), sends demonstration cartridge data to the TV/STB.

The G-link cartridge guarantees that an EPG demonstration is available in the retail environment. In a retail environment, it is useful to demonstrate an EPG with canned demonstration data, rather than with live data because it provides a consistent message to all consumers and minimizes sales force training time. "Canned demonstration data" is the phrase used to describe the channel lineup and programming data that are stored in the G-link cartridge, as opposed to data received from a broadcast television signal.

Provided that canned demonstration data is desired, it would be a waste of broadcast bandwidth to download such demonstration data via the VBI. It is wasteful to broadcast "demo

1 pictures," illustrations and diagrams that are useful in a retail setting but are worthless to the end
users of a live broadcast. In addition, the downloading of EPG data via the VBI is prone to
network operator error. In short, allowing retail TV/STB units to run off of VBI patches and data
would be a waste of bandwidth and would be prone to network operator errors. In any case, most
5 consumer electronics stores do not have live feeds, consequently, canned EPG data is needed to
demonstrate an EPG.

The G-link cartridge has data and instructions for the EPG. In the preferred embodiment
of the invention, the cartridge's data and instructions resides on the cartridge's ROM and is sent
to the TV/STB over a G-Link bus as a "G-link patch." It is a patch because many of the EPG's
10 functions exist in the TV/STB memory prior to the G-link patch being transferred to the TV/STB.
The G-link patch sends incremental functions for the EPG. In an alternative embodiment of the
invention, the cartridge's data and instructions may reside on any kind of non-volatile memory
and may be sent over any kind of bus that interfaces with a TV/STB unit.

Essentially the patching scheme deployed in the G-link cartridge is different from the
15 usual VBI patching scheme. The G-link cartridge patch download from the G-link cartridge to
the TV/STB is a 3-stage bootstrap process: (1) an initial bootstrap; (2) a final bootstrap; and (3)
a patch load. Each stage provides items that are used in the next stage. The preceding stage must
be successfully completed before the next one can begin. The TV/STB acts as the master and
the G-link cartridge acts as the slave.

20 The initial bootstrap stage provides the essential tools used in the Stage 2, Final Bootstrap.
Figure 1 shows the initial bootstrap stage. After the successful completion of the initial bootstrap
stage, the following items are available for use in the next stage: Faster probe packets (every .5
seconds), Watchdog timer, and End of stage packet handler.

At the beginning of the initial bootstrap stage, the G-link cartridge is in its initial state 10.
25 The TV/STB, which is a G-link master device, routinely sends to the G-link cartridge, a probe
request packet 11 that looks for the presence of a G-link slave device. In a preferred embodiment
of the invention, if the TV/STB determines within 5.6 seconds 12 that the G-link cartridge is
present, then the G-link cartridge sends an identify response packet 13. The TV/STB requests
the next packet from the G-link cartridge 14. In a preferred embodiment of the invention, if the
30 G-link cartridge responds within 5.6 seconds to the next packet request 15, then the G-link
cartridge does a memory write to its memory 16. The TV/STB sends another probe request
packet to the G-link cartridge 17. The G-link cartridge does a memory write to the TV/STB that
causes the TV/STB to "execute" the instructions within the memory write 18. The TV/STB
executes the instructions contained within the memory write from the G-link cartridge 19.

35 The final bootstrap stage provides the patch information that is loaded in the third stage.
Figure 2 shows the final bootstrap stage. After the successful completion of the final bootstrap
stage, the following items are available: TV screen display that shows real-time download
percent complete, watchdog timer (replaces watchdog timer from stage 1), Get Next packet

1 (suppresses Probe packets from stage 1), End of stage packet handler (replaces End of stage packet from stage 1), Retry packet, and size of a final patch.

At the beginning of the final bootstrap stage, the TV/STB sends a probe request packet to the G-link cartridge 20. In a preferred embodiment of the invention, the TV/STB determines within .5 seconds whether the G-link cartridge has responded to the TV/STB 21. If the G-link cartridge does respond within .5 seconds, then the G-link cartridge does a memory write 22 until the end of the final bootstrap stage 23. At the end of the final bootstrap stage, the instruction within the memory writes are executed by the TV/STB 24.

Figure 3 shows the 20-second timer flowchart, which is applicable in a preferred embodiment of the invention. During the final bootstrap stage, if a 20-second timer expires 30, then the bootstrap process returns to the initial bootstrap stage 31, otherwise the bootstrap process is proceeding properly 32.

Figure 4 shows the patch load stage. The patch load stage arranges the information from the first two stages into usable patch code. At the beginning of the patch load stage, the TV/STB gets a new packet from the G-link cartridge 40. The G-link cartridge does a memory write from its memory to the TV/STB 41. The TV/STB determines whether the packet has been successfully received by the TV/STB within a timer period 42. In the preferred embodiment of the invention, the timer period is three seconds. If the timer period expires 43, then the packet was not successfully transferred from the G-link cartridge to the TV/STB. If the packet is determined to be successfully received, then the timer period is reset 44, the displayed percentage completed on the television screen is incremented 45, and the TV/STB gets the next packet from the G-link cartridge 40. When the patch load end of stage is reached 46, the TV/STB goes into a patch load warm reset state. When the timer period expires 43, then the TV/STB determines whether a retry counter is greater than zero 50. The retry counter represents the number of times the TV/STB will retry a packet request because of the timer period expiration. If the retry counter is greater than zero, then the TV/STB will request another packet from the G-link cartridge 51. If the retry counter is not greater than zero, then the retry counter has been exhausted and the bootstrap process returns to stage 1, the Initial Bootstrap stage 52.

The G-link cartridge detects whether the TV/STB is a legacy product or a new product by examining a self-identification string from the TV/STB. This allows multiple G-link cartridge software versions to be put onto the same G-link cartridge memory. The appropriate version is sent from the G-link cartridge to the TV/STB when the TV/STB unit is identified.

After the code from the G-link cartridge has been downloaded into the TV/STB, the G-link cartridge monitors the G-Link bus to detect a reset of the EPG. If such a reset is detected, the G-link cartridge sends the patch again. The reset feature makes the system more robust. The download protocol is made robust, by incorporating retries, timeouts etc.

A G-link cartridge software version includes an auto-demo mode and/or an interactive demo mode. The auto-demo mode is an auto-looped presentation of an EPG's features. This

1 mode is not interactive. Screens on the television change automatically, thereby allowing the
viewer to sit back and enjoy the show without having to enter any input. The auto-demo mode
may be restarted by the viewer at any time. A continuous auto-demo mode, which also may
5 be activated by the viewer, provides a continuous automated demonstration. The demonstration
is automatically restarted once it is ended. In interactive demo mode, the sales person or the
customer can test-drive the EPG using the G-link cartridge sample channels and programs. The
interactive demo mode has a timeout feature that upon expiration of a time period, the interactive
demo mode terminates and the auto-demo is activated.

10 Once the G-Link cartridge is connected, the television will display a demonstration
banner from which the demonstration can be activated. When the demonstration is activated, the
demonstration will consist of display screens with pre-loaded simulated television programming
data, along with text box overlays to provide narrative descriptions and visual examples of EPG
product features.

15 The G-link cartridge is designed to allow the viewer (a retailer or potential purchaser) to
interrupt the demonstration and "interact" with the product (with the pre-loaded, simulated data).
Following a period of no activity (no buttons pressed), a timeout occurs and the beginning of the
demonstration is restarted. When the demonstration is finished, the television will return to its
normal viewing mode with a small demonstration banner appearing at the bottom of the screen.
20 This banner is intended to visually communicate that the television is equipped with an EPG and
that a demonstration is available.

The G-link demonstration may also be activated through the Manufacturer's menus.
Selecting the "Continuous Demonstration" menu item will activate the G-link demonstration in
a continuous mode. It can be exited by pressing the same button that will exit the internal
continuous demo.

25 The retailer needs to follow very few steps to install the G-link cartridge in order to make
the cartridge extremely simple – literally "plug and play." In order for the G-link cartridge to be
"plug and play," the setup must consist of no more than inserting the cartridge's G-link cable into
the G-link port on the rear of the television, powering up the cartridge, and downloading the data
into the television. The retailer is not required or expected to enter the regular Guide setup
30 screens.

Figure 5 depicts the G-link cartridge with AC-DC power converter, connector, and G-link
television port. The television port may reside anywhere on the television depending upon a
given manufacturer's television design. In an alternative embodiment of the invention, the G-link
cartridge can also be connected to an EPG equipped set-top box.

35 In the preferred embodiment of the invention, the G-link cartridge setup includes the
following:

- (1) unplugging the TV/STB;
- (2) plugging the G-link connector 100 into an input on the back of an EPG equipped

1 TV/STB 102;

(3) plugging an AC-to-DC power converter 104 into an AC outlet;

(4) plugging in the television and/or set-top box;

5 (5) the following information is displayed on the television screen: an EPG logo appears on the television screen, providing visual confirmation that the G-link cartridge is connected correctly; meanwhile the demonstration data loads from the cartridge to the television and a message is displayed on the television indicating that data is being loaded; and a Progress Bar with % completion, providing an on-screen indication of how much of the data loading has been completed (e.g., 32% completed, 48% completed, 65% completed, etc.);

10 (6) once the demonstration data is fully loaded, the TV/STB goes to regular TV/STB viewing mode and a Demonstration Banner appears at the bottom of the screen and a prompt will appear on the television screen indicating how to start the demonstration; and

(7) When the GUIDE button on the remote control is pressed, the Demonstration mode is activated and the demonstration begins.

15 In the preferred embodiment of the invention, the connector 100 is an infrared (IR) extender device. In an alternative embodiment of the invention, the connector uses other means of communication, such as radio frequencies (RF). In the preferred embodiment of the invention, the port into which the connector is input, is a G-link. G-link is the location where the IR extender device is connected. G-link is also the port and serial communication protocol that

20 allows a G-link cartridge to talk to an EPG board and firmware.

Once the G-link cartridge is installed, attempting to enter Set up through the manufacturer's menus or the Factory Test will activate the demonstration. In an exemplary embodiment of the invention, the demonstration will also be activated by pressing the VCR Plus+ key.

25 Figures 6-10 show setup screens in an exemplary embodiment of the invention. They are screen samples of the demonstrations. Figure 6 shows the initial screen when the G-link cartridge is plugged in. The initial screen indicates that the cartridge is installed correctly. Figure 7 shows the screen when the data begins downloading from the G-link cartridge. The data loading message indicates that there will be a delay before the demonstration begins. A progress bar with percent complete should be displayed until the data loading is complete. Figure 8 shows

30 the screen after 65% of the data has been loaded into the TV/STB. Figure 9 shows the screen after 95% of the data has been loaded into the TV/STB. Figure 10 shows a screen where the data has finished loading into the TV/STB. When the data has finished loading, the TV/STB returns to a television watching mode and the Demonstration Banner is displayed on the television. The Demonstration Banner consists of the GUIDE Plus+ logo and the text "Press GUIDE for Demo" 110. The word "GUIDE" will appear overlaying a button bitmap. When the GUIDE button on

35 the remote control is pressed, the demonstration is activated.

In the preferred embodiment of the invention, all of the demonstration data is loaded into

1 the TV/STB initially. In an alternative embodiment of the invention, different demonstration data
can be loaded into the TV/STB based on user input or the state of the EPG. The state of the EPG
can be a function of the screens entered, time of day, user input, etc.

5 The G-link cartridge must remain connected to the TV/STB to keep the demonstration
active because the demonstration data will be lost on a system reset. The most likely, but not
necessarily the only cause for such a reset is that the TV/STB loses power for an extended period
of time, which is common in a retail environment where power is often turned off every evening.
If AC power is turned off, the demonstration data will automatically reload when it is turned back
on provided that the G-link cartridge is attached to the TV/STB. Thus, if power is turned off in
10 the evening, the demonstration data will be automatically reloaded when power is turned back
on the morning.

Canned Demonstration Data

15 The television stores one set of data, either "canned" or "live." It cannot maintain both
sets of data in the television RAM simultaneously. An EPG setup requires a user to enter
information such as zip code, TV/STB brand, etc. In order to provide a satisfactory product
demonstration without requiring a retailer to go through an EPG setup, the G-link cartridge
enables a demonstration that will display only the canned TV programming data. This is the only
way to guarantee a full set of useful data for the demonstration, as retail locations very often do
20 not provide an adequate VBI feed.

In the preferred embodiment of the invention, the demonstration data will comprise the
following components:

26 channels of programming will be included. The following channels in this order are required:
25 an ABC, FOX, CBS, NBC, UPN, WB, PBS, CBC, American Movie Classics, BET,
Cinemax, CNBC, The Discovery Channel, Disney, ESPN, ESPN 2, FX, The History Channel,
HBO, Lifetime, MSNBC, Nickelodeon, Sci-Fi, TNT, Univision and USA. These channels
are being selected specifically because of their broad national distribution as well as their
content and propensity for interesting descriptions.

30 2 days of titles and descriptions for all 26 channels and an additional five days of titles and
descriptions for the Sort categories (Movies, Sports, Children's) will be stored. The "current
time" when the demonstration is started will be Wednesday, 8:00 P.M..

The data provides minimal "dating" of content.

35 The clock in the Picture-in-picture (PIP) will be replaced with "Simulated <call letters>." While
in the demonstration mode, the video displayed in the PIP will not correspond to the data in
the EPG since the EPG data is canned (and often the video will be laser disk video). Because
of this, the video presented in the PIP will be whatever video is being broadcast to the TV
during the time the demonstration is running. This could cause confusion, therefore, the PIP

1 will "note" that the data is simulated throughout the demonstration. This will be executed
via an overlay on the PIP as shown in figure 11.

5 Figure 11 shows the "Simulated <call letters>" where the call letters are "CBS" 120. The call
letters will match what is highlighted in the EPG or the channel to which the guide is locked in
the demonstration.

Interactivity

10 Once the G-link cartridge is installed and the data is loaded, a potential viewer/buyer knows
that the television is EPG equipped via an on-screen prompt. The on-screen prompt is part of a
Demonstration Banner at the bottom of the television screen. To start the demonstration, the
viewer simply presses the GUIDE button, as indicated in the prompt. This is the first level of
"interactivity" in the demonstration.

15 In the preferred embodiment of the invention, the Demonstration Banner is approximately
1/4 the width of the screen. It will start in the bottom/center of the screen. To reduce burn-in on
the television screen, it will be necessary to move it's location every few minutes.

20 The demonstration is designed to be extensively interactive. The viewer is able to interrupt
the demonstration and sample various EPG screens. Canned data allows the viewer to access and
use the functionality demonstrated. At any time during the demonstration, the viewer may press
any of the buttons the EPG recognizes (for example: Guide, OK, up, down, left, right, info, menu,
PIP, or a digit key) on the remote to interrupt the Demonstration and activate the Interactive
Guide mode. When this happens, the Grid screen will appear defaulting to the locked PIP mode
(since the video cannot be changed). There will be prompts during the demonstration that
suggest to the viewer to interrupt the demonstration and use the features and functions described
25 in the demo.

30 If the demonstration mode is entered from the Manufacturer's menu while the G-link
cartridge is connected, the demonstration activated will be the external demonstration cartridge
version. This demonstration will be continuous and non-interactive. This mode may be desirable
when set up on an end cap ("end cap" is a retail term. It refers to the end of a product aisle, which
is considered a premium location for product to be displayed) or a location not easily reached by
a sales associate or customer.

35 The following table lists remote keys and what will occur in the preferred embodiment of the
invention while in the G-link cartridge is connected.

Mode (following the installation of the demonstration cartridge)	Key	Result
TV Viewing Mode	Guide, VCR Plus+	Demonstration will be activated and Demo will begin to show screens in sequential order
TV Viewing Mode	All others	Will perform the way they normally would with TV Viewing
Demonstration Mode	Guide Recognized Keys (Guide, OK, up, down, left, right, info, menu, PIP, or a digit key)	Demonstration will be interrupted and the Interactive Mode will begin. The viewer may now "interact" with the Guide using the canned data.
Demonstration Mode	Volume + or -	Will work normally
Demonstration Mode	Clear	Demo will be exited and TV mode will be activated. The demo banner will be displayed.
Demonstration Mode	All other remote keys	Do nothing
Interactive Mode	Guide	Demonstration will be reactivated at the beginning and replay.

<p>Interactive Mode</p>	<p>All Others</p>	<p>Will perform the way they normally would during Guide Mode but data will be simulated.</p> <p>If the OK/Select/Enter button is pressed, video will be displayed with a text overlay indicating the video is simulated and what show and channel would have appeared if the viewer was at home.</p>
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There are video overlays in the Interactive Mode. While in Interactive Mode, pressing the OK/Enter/Select button will drop the Guide and display the video supplied to the TV. Figure 12 shows an overlay message, which indicates that the video is simulated and that the viewer would be watching "<Show title> on <call letters>" if the viewer were at home 130. In figure 12 the show title is "Walker, Texas Ranger," and the call letters are CBS.

Timeouts

A television has a manufacturer's time out. The demonstration overrides the manufacturer's time out to avoid the demonstration failing to complete.

The demonstration has an Interactive Mode Timeout. Once in interactive mode, if there are no buttons pressed after a period of time, a timeout will return the viewer back to the beginning of the demonstration and the demonstration will continue until it is completed. The demonstration can be "interrupted" and the EPG "test driven" an unlimited number of times. When the demonstration is complete, the TV/STB will return to TV viewing mode and the EPG Demonstration Banner will return to the bottom of the screen.

Manufacturer specific screens, text, functionality, and customization

Screens will be manufacturer specific and therefore may look slightly different. Additionally, text may require slight variations by manufacturer to accommodate different buttons labels, etc. Consequently, there are manufacturer ID code triggers for text differences, screen differences and functionality differences.

Although differences in "look and feel" and EPG functionality will be addressed with manufacturer ID code triggers, a manufacturer may want to include their logos in the demonstration. Graphic customization by original equipment manufacturers (OEMs) will be

1 limited to logo/text displays in predefined areas of the demonstration, likely limited to one splash screen at the beginning of the demonstration.

On-Screen "look and feel"

5 The demonstration will include overlay boxes. Each function demonstrated will be presented with an on-screen text box describing its functionality. To accomplish this, there may be multiple "actions" or events. (For example, a screen will be presented, an overlay box with text will be wiped into the screen, then following a predetermined timeout period, the text box and copy are wiped off the screen from left to right.)

10 The overlay box will be solid in color (light yellow with a solid black border) and will be sized for the copy. Its location on the screen will be determined by what is being demonstrated and what should or could be covered up. The demonstration begins with a dark blue screen with a product logo and features list. This screen is repeated at the end of the demonstration along with two call to action screens (pick up the remote and try the guide instructions). These are the only places where the text box and copy colors vary.

15 The demonstration simulates product usage. Several screens may be strung together to give the simulated appearance of using the product. An example of this is using the "sort" function to find a particular theme movie. The sequence of screens would first include the main sort screen, an overlay box describing the functionality, then a second screen would display what appears on the screen when "Movies" are selected from the screen, the third screen would display a simulated selection of "All," the fourth screen would display a simulated listing of all the movies available.

20 In alternative embodiments of the invention, various colors can be used for text. In the preferred embodiment of the invention, when the text is in the text boxes, it will be black. In addition, the text on the introductory screens and the closing call to action screens will be white.

25 A font different from that used in EPG must be downloaded from the G-link cartridge to be used in the text boxes of the external demonstration. The font recommendation is Tekton (Regular, not the italic version).

30 *Some graphics may be used to enhance the external demonstration. Some graphics that may be incorporated include full screen EPG and OEM logos, and small, icon-like graphics to enhance the text boxes.*

35 Animation can be used at certain points in the demonstration to enhance the demonstration and increase the entertainment value of the demonstration. Logos or other graphics may be used in an animated format.

1 WHAT IS CLAIMED IS:

1. A system for reprogramming a consumer electronic device comprising:

5 a consumer electronic device (CED) having a CED processor and a CED memory and a CED serial port connected to the processor, the memory storing CED processor instructions and CED data;

a download module having a download processor and a download memory and a download serial port connected to the download processor;

10 wherein the CED processor periodically applies a signal to the CED serial port; and

wherein, when the download serial port is connected to the CED serial port to make a serial connection and when the download processor receives one of the periodic signals from the CED processor over the serial connection, the download processor initiates the download of one or more of download instructions and download data from the download memory to the CED memory over the serial connection.

2. The system of claim 1 wherein the one or more of download instructions and download data comprises a bootstrap download and a patch download.

20 3. The system of claim 1 wherein the CED processor instructions and CED data are not discarded from the CED memory when the one or more of download instructions and download data downloaded to the CED memory.

25 4. The system of claim 1 wherein the one or more of download instructions and download data comprises one or more of a demonstration program and a set of demonstration data that is used by the CED processor to generate a demonstration on the consumer electronic device.

30 5. The system of claim 1 wherein the consumer electronic device is a television.

35 6. The system of claim 1 wherein the consumer electronic device is a video recorder.

7. The system of claim 1 wherein the consumer electronic device is a television set top box.

1 8. The system of claim 1 wherein the consumer electronic device is a hard disk
video recorder.

5 9. The system of claim 1 wherein the consumer electronic device is a satellite
receiver.

 10. The system of claim 1 wherein the consumer electronic device is a cable box.

10 11. The system of claim 1 wherein the one or more of download instructions and
download data comprises a demonstration interactive electronic program guide.

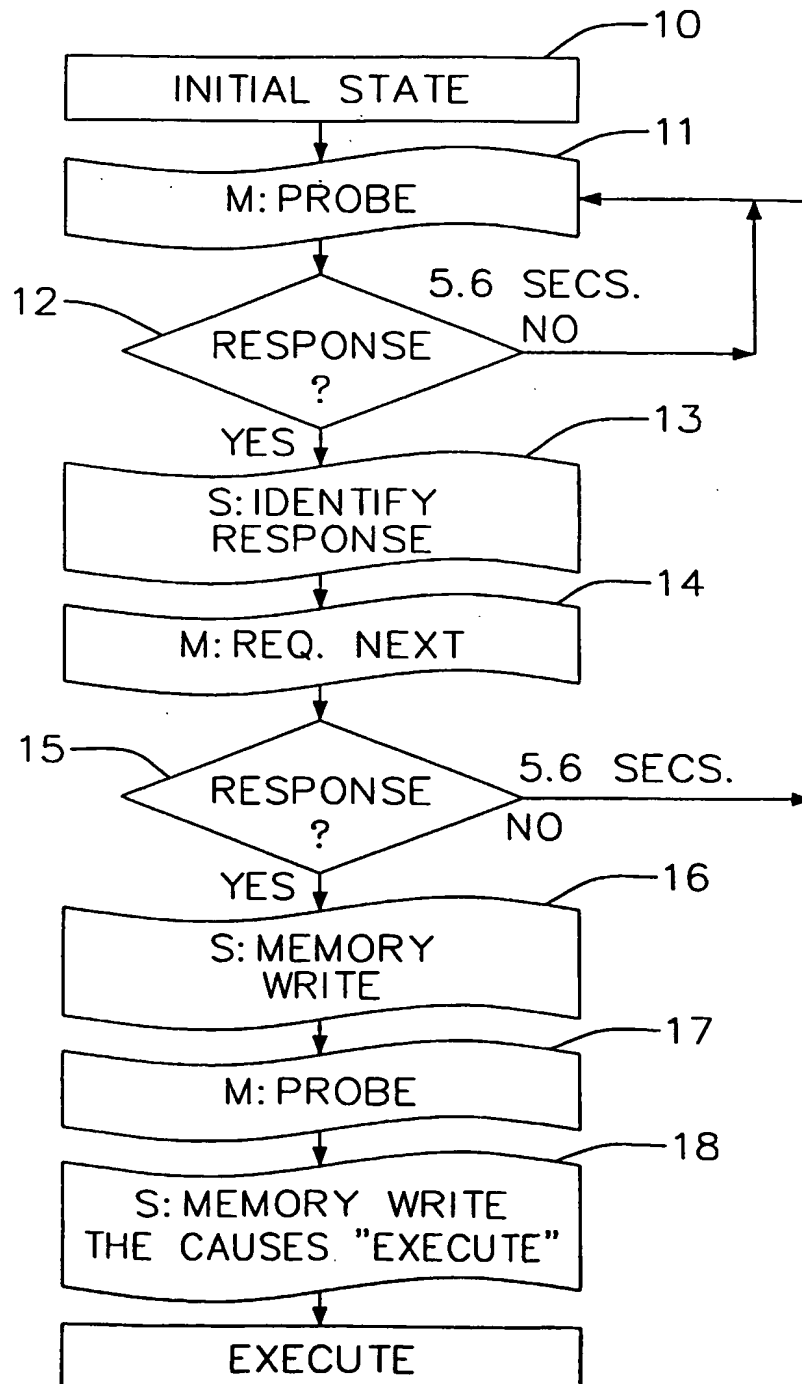
FIG. 1

FIG. 2

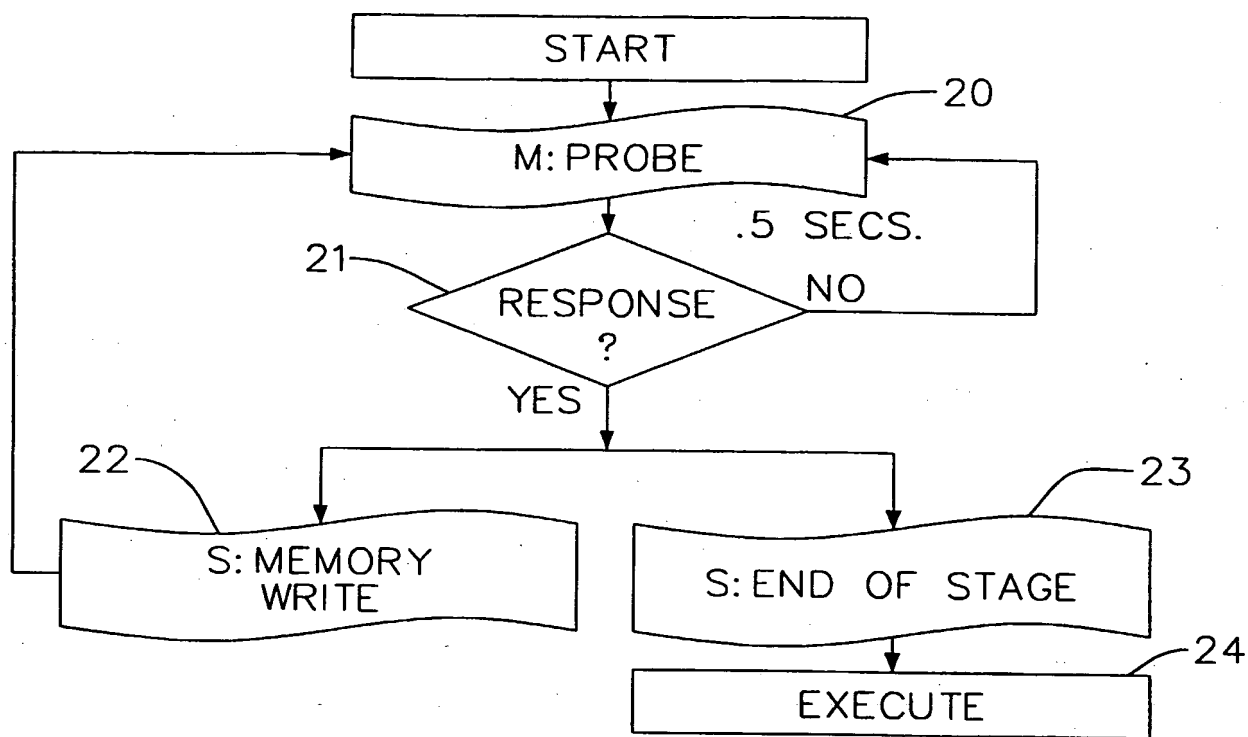


FIG. 3

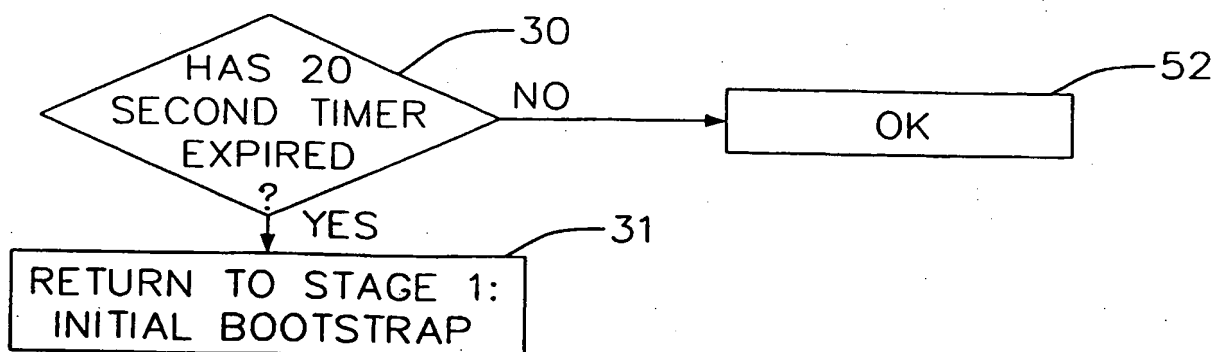
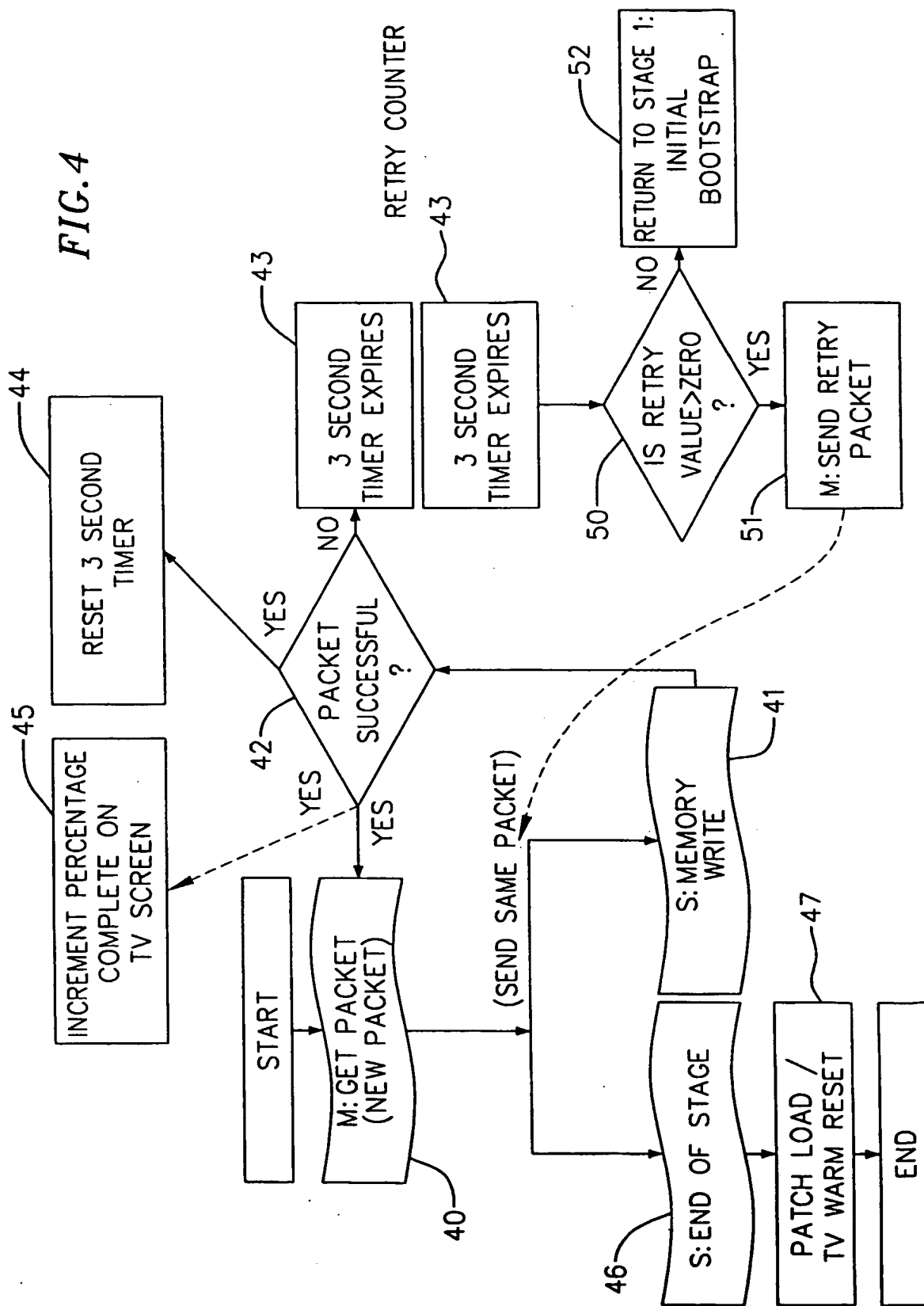


FIG. 4



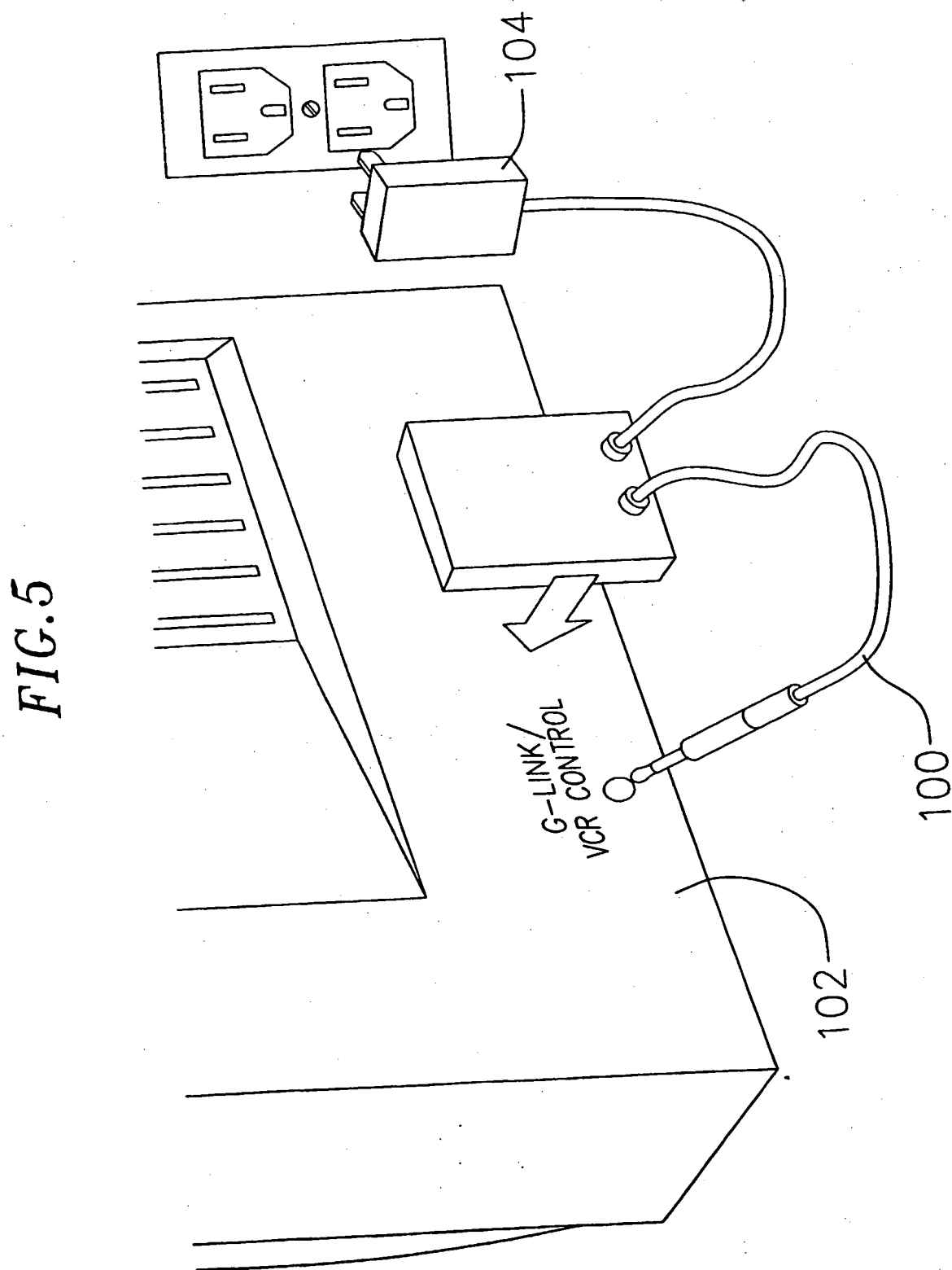


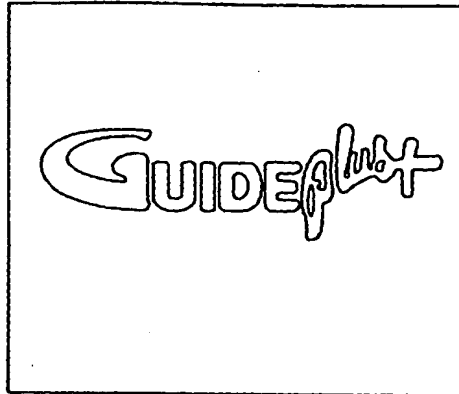
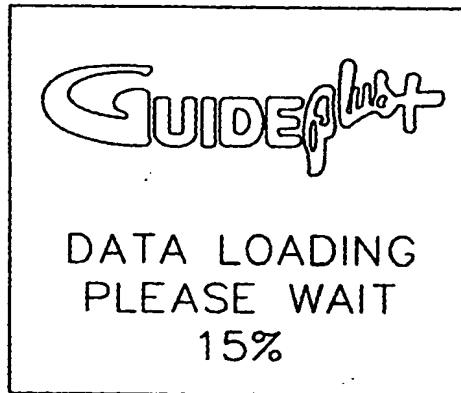
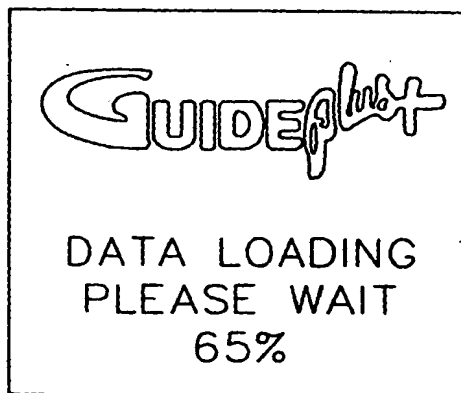
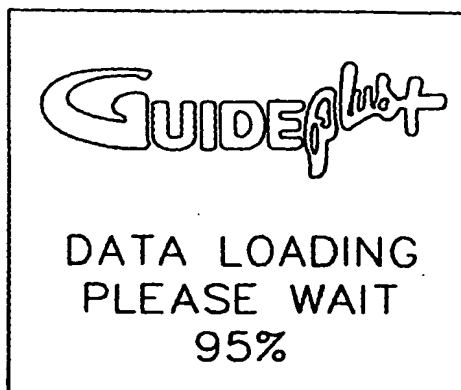
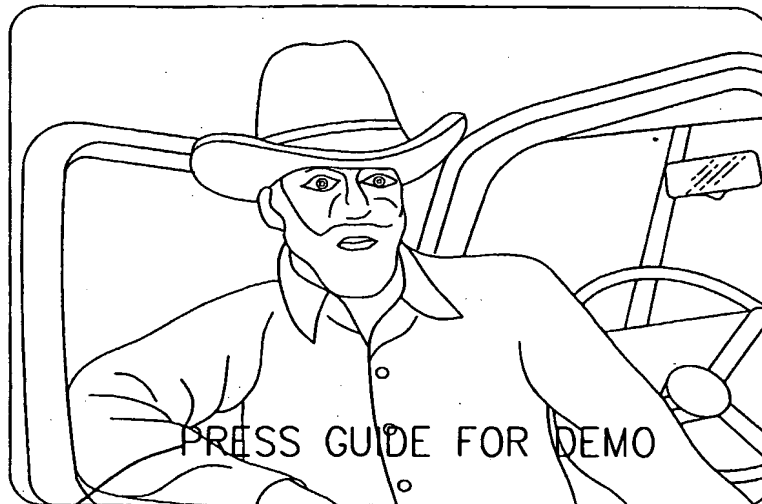
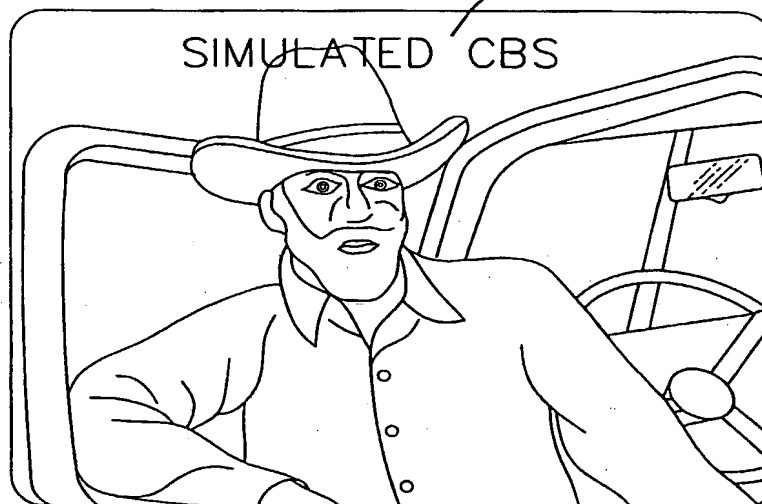
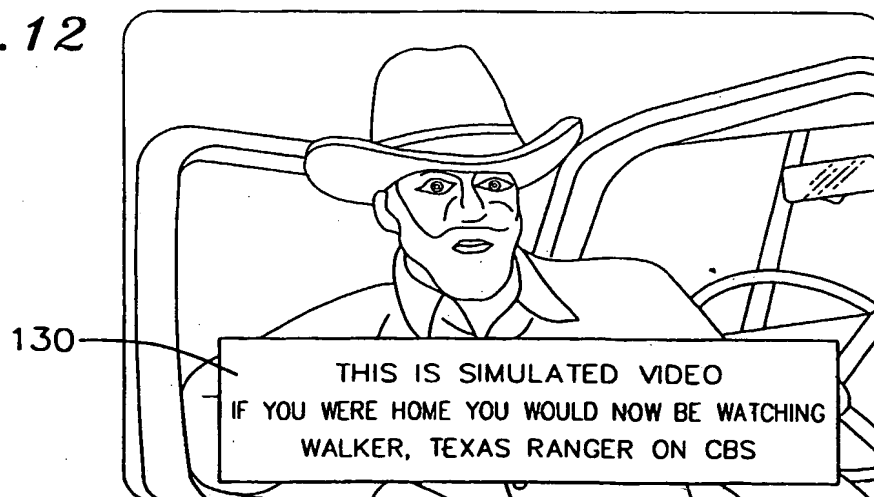
FIG. 6*FIG. 7**FIG. 8**FIG. 9*

FIG. 10

110

120

FIG. 11**FIG. 12**

130

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 00/13453

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H04N5/445

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	WO 94 14284 A (DISCOVERY COMMUNICAT INC) 23 June 1994 (1994-06-23) abstract page 4, line 5 - line 27; figure 1 page 18, line 14 -page 21, line 26; figure 1	1 5,7,10, 11
A	WO 94 13107 A (DISCOVERY COMMUNICAT INC) 9 June 1994 (1994-06-09) page 50, line 15 -page 57, line 16; figures 11,12A	1,5,7, 10,11
A	US 5 657 072 A (CRITES BRIAN D ET AL) 12 August 1997 (1997-08-12) column 3, line 5 - line 26 column 7, line 40 -column 9, line 4; figures 4,5	1,5,7,11
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

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International Application No
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